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# The genus *Melicope* (*Rutaceae*) in Borneo

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**Summary.** *Melicope* J.R. & G. Forster is represented in Borneo by 13 or perhaps 14 species. Full descriptions and notes on main diagnostic features are given for the genus and the species and a key to the latter is provided. Twelve new binomials are proposed. Of these, *M. clemensiae* T. Hartley, *M. jugosa* T. Hartley, and *M. sororia* T. Hartley are new species, *M. hookeri* T. Hartley and *M. incana* T. Hartley are new names, and *M. accedens* (Blume) T. Hartley, *M. bonwickii* (F. Muell.) T. Hartley, *M. denhamii* (Seem.) T. Hartley, *M. glabra* (Blume) T. Hartley, *M. latifolia* (DC) T. Hartley, *M. lunu-ankenda* (Gaertn.) T. Hartley, and *M. subunifoliolata* (Stapf) T. Hartley are new combinations. The occurrence of *M. glabra* in Borneo requires verification.

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The purpose of this paper is to provide an account of the Bornean species of *Melicope* J. R. & G. Forster which will serve as a basis for the treatment of the genus to be prepared by Dr David T. Jones for the forthcoming *Tree Flora of Sabah and Sarawak*. I am preparing a revision of the Indo-Pacific (excepting Hawaii) species of the genus, but it is not likely to be published in time for the names and details of the Bornean species to be utilized by Dr Jones.

## The genus *Melicope*

Shrubs (rarely scandent) or trees. Leaves opposite or whorled, digitately trifoliolate or unifoliolate. Inflorescences cymose or thyrsiform or sometimes reduced to solitary flowers, axillary or ramuligerous (i.e., on branchlets below leaves) or rarely terminal, ramigerous, or cauligerous. Flowers small, bisexual or functionally unisexual; sepals 4; petals 4,

distinct, valvate or narrowly imbricate; stamens (rudimentary in female flowers) 8 or 4 or rarely 8-4, distinct; disc intrastaminal, pulvinate to annular or cupular; gynoecium (rudimentary or sometimes obsolete in male flowers) 4-carpellate, the carpels connate basally or up to their full length, with a common apical or subapical style or the stylar elements rarely becoming divergent, the stigma punctiform to capitate, peltate, or 4-branched, the ovules 2 or 1 per carpel. Fruit of 1-4 basally connate follicles (the abortive carpels, if any, persistent) or grading to syncarpous (carpels united into a 4-locular, loculicidally dehiscent capsule); endocarp pergamentaceous to cartilaginous, adnate to or separate from epicarp in mature fruit but not expelled at dehiscence. Seeds solitary or in pairs, remaining attached in dehisced fruit; testa with thick inner layer of dense, black sclerenchyma and spongy outer layer bounded externally by a shiny, black pellicle; endosperm copious; embryo straight or slightly curved, the cotyledons somewhat flattened, elliptic, planate, the hypocotyl superior.

DISTRIBUTION. Malagasy and Indo-Himalayan regions eastward to the Hawaiian and Marquesan Islands and south to New Zealand. About 230 species, 13 or 14 of which occur in Borneo.

*Melicope* is characterized mainly by its combination of opposite or whorled, digitately trifoliolate or unifoliolate leaves, dehiscent fruit, and shiny, black, pelliculose seeds which remain attached in the dehisced fruit. *Euodia* J.R. & G. Forster, with which *Melicope* was long confused, consists of seven species and ranges from New Guinea and northeastern Australia east to Samoa, Tonga, and Niue. Like *Melicope*, it has opposite, digitately trifoliolate or unifoliolate leaves and dehiscent fruit, but its seeds are neither shiny nor pelliculose and they are forcibly expelled, along with the endocarp, when the fruit dehisces. This classification of the two genera was first proposed in a revision of the southeast Asian genus *Tetradium* Lour. (Hartley, 1981), which itself was long confused with *Euodia*, and was presented a second time (Hartley & Stone, 1989) in a paper in which the mainly Hawaiian genus *Pelea* A. Gray was reduced to *Melicope*.

The manner of attachment of the seed in the dehisced fruit of *Melicope* is variable and provides a useful taxonomic character. In some species, the attachment is either by a partially detached axile strip of pericarp tissue or by a partially detached raphe, or by both. This kind of attachment, which is seen in species 1-3 as enumerated below, is designated as Type A. In other species, neither the pericarp nor the raphe detaches and the two are connected by a funiculus which ranges up to about 3 mm in length. This manner of attachment, which is seen in species 4-14 below, is designated as Type B.

Seeds of *Melicope* are often irregularly angled when two develop in a single fruiting carpel. These shapes, which are caused by crowding, are not given in the descriptions.

Several of the Bornean species of *Melicope* are wide-ranging and widely variable, particularly *M. triphylla* and *M. denhamii*, and have a number of taxonomic synonyms. The synonymies given herein are limited mainly to names of taxa (plus their nomenclatural synonyms) described or otherwise reported from Borneo. With one exception (see *Evodia sensu* Gaertner, mentioned in the synonymy of *M. lunu-ankenda*), the original spelling

*Euodia* is used throughout the synonymies, correcting the orthographic variant *Evodia*, which was used by most of the authors.

**Key to species of *Melicope* in Borneo**

1a. Stamens 8; seed attachment Type A; leaves trifoliolate and/or unifoliolate.

2a. Sepals 1-2 mm long; fruiting carpels 10-13 mm long; leaves trifoliolate and/or unifoliolate.

3a. Terminal bud glabrous ..... 1. *M. jugosa*

3b. Terminal bud puberulent or sparsely so ..... 2. *M. sororia*

2b. Sepals 0.5-0.6 mm long; fruiting carpels 3-5 mm long; leaves, or most of them, trifoliolate ..... 3. *M. triphylla*

1b. Stamens 4; seed attachment Type B; leaves, or most of them, trifoliolate, or, in *M. subunifoliolata*, sometimes exclusively unifoliolate.

4a. Flowers bisexual; stigma punctiform or capitellate, neither lobed nor undulate, 0.1-0.3 mm wide; inflorescences axillary and/or ramuligerous.

5a. Pedicels 4-6 mm long at anthesis, in fruit 6-8.5 mm long; petals sericeous-villous adaxially, 4-5.5 mm long, deciduous in fruit; fruiting carpels 4-6 mm long; leaflet blades entire ..... 4. *M. bonwickii*

5b. Pedicels 0.5-1.5 mm long at anthesis and in fruit; petals glabrous, 1.2-2 mm long, usually persistent or subpersistent in fruit; fruiting carpels 2-3 mm long; leaflet blades entire, or, in cultivated or possibly escaped plants, lobed, sinuate, or repand. ..... 5. *M. denhamii*

4b. Flowers usually functionally unisexual; functional stigma capitate or peltate, lobed or undulate, 0.3-1 mm wide; inflorescences axillary.

6a. Trichomes, or most of them, simple.

7a. Sepals connate in proximal 1/3-2/3; fruiting carpels connate in proximal 1/4-1/2; petiolules obsolete; lateral leaflet blades cordate to rounded or obtuse at base ..... 14. *M. latifolia*

7b. Sepals and fruiting carpels connate at base or up to 1/3 their length; petiolules obsolete or up to 20 mm long; lateral leaflet blades obtuse to attenuate at base.

8a. Petals 1.3-1.8 mm long; fertile anthers about 0.5 mm long; infertile anthers (female flowers) 0.2-0.4 mm long; inflorescences several- or somewhat laxly many-flowered; young branchlets 1.6-3 mm wide in third internode; leaflet blades 1.5-5.5 cm wide.

9a. Leaflet blades glabrous or the midrib, especially below, sparsely and minutely puberulent; fruiting carpels 7-9 mm long, the exocarp glabrate. ..... 9. *M. clemensiae*

9b. Leaflet blades pubescent to velutinous on midrib below, glabrous above; fruiting carpels 10-10.5 mm long, the exocarp hirsutulous ..... 10. *M. subunifoliolata*

8b. Petals 1.5-3 mm long; fertile anthers 0.7-1.5 mm long; infertile anthers (female flowers) 0.3-1 mm long; inflorescences several- to densely many-flowered; young branchlets 2.5-15 mm wide in third internode; leaflet blades 2.5-21 cm wide.

10a. Raphe of seeds contorted, especially in chalazal region (the often somewhat enlarged end of the seed); adaxial surface of petals sericeous or sericeous-pubescent. ..... 6. *M. confusa*

10b. Raphe of seeds not contorted; adaxial surface of petals sparsely puberulent to pilosulose in proximal 1/4-1/2 or glabrous.

11a. Terminal leaflet blades obovate or broadly so, (7.5-) 9-16.5 cm long, the main veins plane or impressed above, 9-15 on each side of the midrib, divergent at angle of 50-60°, the apex usually abruptly and obtusely short-acuminate; main branches of inflorescences ascending; fruiting carpels 3-4 mm long. ..... 7. *M. glabra*

11b. Terminal leaflet blades elliptic to obovate, 3.5-46 cm long, the main veins prominulous to impressed above, 8-24 on each side of midrib, divergent at angle of (50-)60-75°, the apex usually acuminate; main branches of inflorescences spreading or ascending; fruiting carpels 3-10(-12) mm long.

12a. Leaflet blades glabrous or nearly so, up to 23 cm long, the main veins prominulous above; main branches of inflorescences usually ascending; fruiting carpels 6-10(-12) mm long. ..... 8. *M. lunu-ankenda*

12b. Leaflet blades nearly glabrous to pubescent below, up to 46 cm long, the main veins usually impressed above; main branches of inflorescences usually spreading; fruiting carpels 3-5 mm long. ..... ..... 11. *M. accedens*

6b. Trichomes mostly fasciculate or stellate.

13a. Leaflet blades nearly glabrous to puberulent below. ..... ..... 12. *M. hookeri*

13b. Leaflet blades densely whitish tomentose below. ..... ..... 13. *M. incana*

**Systematic Enumeration**

**1. Melicope jugosa** T. Hartley, **sp. nov.**

*Frutex vel arbor 1.8-3 m alta, trichomatibus si praesentibus pro parte maxima simplicibus; ramulis novellis ut gemma terminali et foliis glabris; foliis oppositis, trifoliolatis et/vel unifoliolatis; foliis trifoliolatis 7.5-12.5 cm longis; petiolo 2-5 cm longo; petiolulo in foliolis lateralibus 1-1.5 mm longo, in foliolo terminali 1.5-2 mm longo; foliolii lamina in foliolo terminali elliptico-obovata vel obovata, 4.5-7 x 2-3 cm; foliis unifoliolatis 5.5-16.5 cm longis; petiolo 0.8-3 cm longo; petiolulo obsoleto; foliolii lamina elliptica vel raro elliptico-obovata, 4.8-13.5 x 2.3-5.8 cm; inflorescentiis axillaribus, glabris usque sparse puberulis, pauci- vel plurifloris, 1-2 x 1-1.3 cm, pedunculo 0.3-1 cm longo; floribus ubique glabris vel sepalis irreguliter ciliolatis, unisexualibus (plantae dioeciae); sepalis basi connatis, 1.3-2 mm longis, in fructu deciduis vel subpersistentibus; petalis 3.5-4 mm longis, in fructu deciduis; staminibus 8, staminibus antesepalis in floribus masculis ca. 2.5 mm longis (in floribus femineis ca. 1.7 mm longis), filamento apice anguste obtusa, anthera ca. 1.2 mm longa (in floribus femineis ca. 1 mm longa); gynoecio in floribus femineis 2-2.3 mm longo (in floribus masculis 1.3-1.5 mm longo); carpellis fructificantibus ubique glabris, basi connatis, divaricatis, ellipsoideis, ca. 10 mm longis, exocarpio sicco, endocarpio soluto; seminibus paulo immaturis, per Type A affixis, ca. 8 mm longis.*

*Typus: J. & M.S. Clemens 51184, Borneo, Sabah, Pantai Barat, Mt. Kinabalu, Gurulau Spur (holotypus A; isotypi K, NY, UC).*

Shrub or tree 1.8-3 m high, trichomes, if present, mostly simple. Young branchlets like the terminal bud and leaves glabrous, becoming rather corky, 2.5-4 mm wide in third internode. Leaves opposite, trifoliolate and/or unifoliolate. Trifoliolate leaves 7.5-12.5 cm long; petiole 2-5 cm long, 1-1.5 mm wide at middle; petiolule in lateral leaflets 1-1.5 mm long, in terminal leaflet 1.5-2 mm long; leaflet blades coriaceous, elliptic-obovate or obovate or in lateral leaflets elliptic, in terminal leaflet 4.5-7 x 2-3 cm, the base in lateral leaflets acute to subattenuate, in terminal leaflet subattenuate to attenuate, the margin usually few-crenulate toward apex, the apex rounded or obtuse or abruptly short-acuminate, the midrib plane or slightly impressed above, the main veins prominulous or plane above, in terminal leaflet 7-11 per side, divergent at angle of about 60°, the veinlet reticulation obscure. Unifoliolate leaves 5.5-16.5 cm long; petiole 0.8-3 cm long, 1-2 mm wide at middle; petiolule obsolete; leaflet blade elliptic or rarely elliptic-obovate, 4.8-13.5 x 2.3-5.8 cm, the base rounded or obtuse or rarely narrowly subcordate or acute, the main veins 9-13 per side, divergent at angle of 60-70°, the veinlet reticulation prominulous below or obscure; otherwise similar to trifoliolate leaves. Inflorescences axillary, glabrous to sparsely puberulent, few- or several-flowered, 1-2 x 1-1.3 cm, the peduncle 0.3-1 cm long, the pedicels 2.5-3.5 mm long (about 5 mm long in fruit). Flowers glabrous throughout or sepals irregularly ciliolate, unisexual, plants dioecious; sepals connate at base, suborbicular or ovate, 1.3-2 mm long, deciduous or subpersistent in fruit; petals yellowish green, narrowly imbricate, elliptic, 3.5-4 mm long, deciduous in fruit; stamens 8, the antesepalous ones in male flowers about 2.5 mm long (about 1.7 mm long in female flowers), the filament narrowly obtuse at apex, the anther about 1.2 mm long (about 1 mm long in female flowers); gynoecium in female flowers 2-2.3 mm long (1.3-1.5 mm long in male flowers), the carpels 2-ovulate, the style including stigma about 1.5 mm long, the stigma capitate-peltate, weakly 4-lobed, about 0.6 mm wide. Fruiting carpels glabrous throughout, connate at base, divaricate, ellipsoid, about 10 mm long, the exocarp dry, the endocarp separate; seed attachment Type A; seeds slightly immature, ellipsoid, about 8 mm long.

DISTRIBUTION. Endemic to Sabah; forest from 2250 to 2400 m.

**OTHER SPECIMENS EXAMINED - BORNEO. SABAH**: Pantai Barat: Mt. Tambuyukon, *Aban Gibot* SAN 55416 (SAN); Mt. Kinabalu, Pig Hill, *Chew & Corner* RSNB 4515 (L, Sing); Mt. Kinabalu, Gurulau Spur, *J. & M.S. Clemens* 51077 (A, K, L, NY, UC).

*Melicope jugosa* is very closely related to *M. sororia*, differing mainly in its glabrous terminal bud, shorter petiolules, and larger petals and anthers. The two differ from other Bornean species of the genus mainly in their combination of 8-staminate flowers, comparatively large fruiting carpels, endocarp which is separate from the epicarp in mature fruit, and Type A seed attachment.

The specific epithet is from the Latin *jugosus*, of the mountains, referring to the habitat of the plant.

**2. Melicope sororia** T. Hartley, **sp. nov.**

*Frutex vel arbor 1-4 m alta, trichomatibus pro parte maxima simplicibus; ramulis novellis ut foliis glabris; gemma terminali puberula vel sparse puberula; foliis oppositis, trifoliolatis et/vel unifoliolatis (raro foliis infrequentibus bifoliolatis); foliis trifoliolatis 7.5-25 cm longis; petiolo 3-10 cm longo; petiolulo in foliolis lateralibus 3-10 mm longo, in foliolo terminali 5-15 mm longo; foliolii lamina in foliolo terminali obovatis, 6.5-14 x 3-6 cm; foliis unifoliolatis 6-22 cm longis; petiolo 1-6 cm longo; petiolulo obsoleto vel usque 10 mm longo; foliolii lamina elliptica usque obovata, 5-16 x 2.5-8 cm; inflorescentiis axillaribus, glabris vel pedicellis sparse puberulis, pluri- vel multifloris, 2.5-10 x 1.3-4 cm, pedunculo 1.2-7 cm longo; floribus ubique glabris vel sepalis irregulariter ciliolatis, unisexualibus (plantae dioeciae); sepalis basi connatis, 1-1.5 mm longis, in fructu deciduis vel subpersistentibus; petalis 2-2.5 mm longis, in fructu deciduis; staminibus 8, staminibus antesepalis in floribus masculis ca. 1.5 mm longis (in floribus femineis 1-1.3 mm longis), filamento apice obtuso vel acuto, anthera ca. 0.6 mm longa (in floribus femineis ca. 0.5 mm longa); gynoecio in floribus femineis ca. 1.5 mm longo (in floribus masculis 0.8-1 mm longo); carpellis fructificantibus ubique glabris, basi connatis, divaricatis, ellipsoideis, 10-13 mm longis, exocarpio sicco, endocarpio soluto; seminibus per Type A affixis, 9-10 mm longis.*

*Typus: J. & M.S. Clemens 29477, Borneo, Sabah, Pantai Barat, Mt. Kinabalu, Tenompok (holotypus NY; isotypi A, B, BO, L, UC).*

Shrub or tree 1-4 m high, trichomes mostly simple. Young branchlets like the leaves glabrous, becoming rather corky, 2-4 mm wide in third internode; terminal bud puberulent or sparsely so. Leaves opposite, trifoliolate and/or unifoliolate (rarely occasional leaves bifoliolate). Trifoliolate leaves 7.5-25 cm long; petiole 3-10 cm long, 1-2 mm wide at middle; petiolule in lateral leaflets 3-10 mm long, in terminal leaflet 5-15 mm long; leaflet blades chartaceous or subcoriaceous, in lateral leaflets elliptic to obovate, in terminal leaflet obovate, 6.5-14 x 3-6 cm, the base in lateral leaflets acute to subattenuate, somewhat inequilateral, in terminal leaflet subattenuate or attenuate or rarely acute, the margin entire or in occasional leaflets few-crenulate toward apex, the apex acuminate or rarely rounded or obtuse, the midrib plane or slightly impressed above, the main veins prominulous or plane above, in terminal leaflet 7-11 per side, divergent at angle of 60-75°, the veinlet reticulation prominulous to subobscure. Unifoliolate leaves 6-22 cm long; petiole 1-6 cm long; petiolule obsolete or up to 10 mm long; leaflet blade elliptic to obovate, 5-16 x 2.5-8 cm, the base subattenuate or rarely subrounded; otherwise similar to trifoliolate leaves. Inflorescences axillary, glabrous or with sparsely puberulent pedicels, several- or many-flowered, 2.5-10 x 1.3-4 cm, the peduncle 1.2-7 cm long, the pedicels 1.5-3.5 mm long (5-6.5 mm long in fruit). Flowers glabrous throughout or sepals irregularly ciliolate, unisexual, plants dioecious; sepals connate at base, suborbicular, ovate, or elliptic, 1-1.5 mm long, deciduous or subpersistent in fruit; petals white, greenish, or cream, narrowly imbricate, ovate-elliptic or broadly elliptic, 2-2.5 mm long, deciduous in fruit; stamens 8, the antesepalous ones in male flowers about 1.5 mm long (1-1.3 mm long in female flowers), the filament narrowly obtuse or acute at apex, the anther about 0.6 mm long (about 0.5 mm long in female flowers); gynoecium in female flowers about 1.5 mm long (0.8-1 mm long in male flowers), the carpels 2-ovulate, the style including

stigma about 1 mm long, the stigma capitate-peltate, weakly 4-lobed, about 0.6 mm wide. Fruiting carpels glabrous throughout, connate at base, divaricate, ellipsoid, 10-13 mm long, the exocarp dry, the endocarp separate; seed attachment Type A; seeds ellipsoid, 9-10 mm long.

DISTRIBUTION. Endemic to Sabah; forest from 1500 to 2400 m.

**OTHER SPECIMENS EXAMINED - BORNEO. SABAH**: Pendalaman: Gunung Alab, *Meijer* SAN 21892 (SAN). Pantai Barat (all from Mt. Kinabalu and vicinity): Kamborongoh, *Carr* SF 27490 (SING), SF 27663 (SING), *Sinanggul* SAN 38319 (SAN); Bembangan River, *Chew & Corner* RSNB 4547 (K, L, SING), RSNB 4558 (K, L, SING); eastern shoulder, *Chew et al.* RSNB 197 (BO, CANB, K, SING); Kumburanga, *J. & M.S. Clemens* 29810 (A, B, BO, L, NY, UC); Penataran River, *J. & M.S. Clemens* 33623 (A, BO, L, NY, UC); Penibukan, *J. & M.S. Clemens* 31408 (A, BO, L, NY); Marai Parai, *J. & M.S. Clemens* 32652 (A, BO, L, NY, UC); Gurulau Spur, *J. & M.S. Clemens* 51052 (A, K, L, NY, UC); Bukit Tupai loop trail, *Aban Gibot* SAN 79591 (SAN); below Layang Layang, *Mikil* SAN 46579 (L); descent trail from Panar Leban, *Stone* 11398 (L); without precise locality, *Griswold* 45 (A), *Hou* 232 (L).

*Melicope sororia* is very closely related to *M. jugosa* (*q.v.*). The specific epithet (from the Latin *sororius*, sisterly) refers to this relationship.

**3. Melicope triphylla** (Lam.) Merr. in Philipp. J. Sci. (Bot.) 7 (1913) 375. *Fagara triphylla* Lam. Encycl. 2 (1788) 447. *Euodia triphylla* (Lam.) DC, Prodr. 1 (1824) 724. *Zanthoxylum lamarckianum* Cham., in Linnaea 5 (1830) 58, as *lamarkianum*, *nom. illeg.* *Zanthoxylum triphyllum* (Lam.) G. Don, Gen. Hist. 1 (1831) 804. *Euodia lamarckiana* (Cham.) Benth. Fl. Hongk. (1861) 59, *nom. illeg.* *Ampacus triphylla* (Lam.) Kuntze, Revis. Gen. Pl. 1 (1891) 98. Type: *Sonnerat*, Philippines (holotype P).

Shrub or tree 1.5-15 m high, trichomes (if present) simple. Young branchlets like the petioles glabrous to pubescent and sometimes glaucous, 1-7 mm wide in third internode; terminal bud glabrous to velutinous. Leaves opposite, trifoliolate and/or unifoliolate. Trifoliolate leaves 4.5-42 cm long; petiole 1-15 cm long, 0.5-3.5 mm wide at middle; petiolule in lateral leaflets obsolete or up to 35 mm long, in terminal leaflet 1-40 mm long; leaflet blades chartaceous or subcoriaceous or rarely coriaceous, glabrous to rather sparsely puberulent below, glabrous above, elliptic or narrowly so to obovate or oblanceolate or rarely rather narrowly ovate, in terminal leaflet 3-28 x 0.9-10.5 cm, the base acute to attenuate (sometimes inequilateral in lateral leaflets), the margin entire, the apex acute to acuminate or rarely rounded, obtuse, or emarginate, the midrib prominent to plane above, the main veins prominent to plane above, in terminal leaflet 7-19(-25) per side, divergent at angle of 60-80°, the veinlet reticulation obscure or rarely prominent or prominulous. Unifoliolate leaves 5-40 cm long; petiole 0.8-5.5 cm long, 1-4 mm wide at middle;petiolule obsolete or up to 20 mm long; leaflet blade ovate-elliptic or narrowly so to obovate or oblanceolate, 4-34 x 1.8-17 cm, the base acute to attenuate or rarely

obtuse, the apex rounded to acuminate, the veinlet reticulation prominulous to obscure; otherwise similar to trifoliolate leaves. Inflorescences axillary and/or ramuligerous, few- to densely many-flowered, 1-13 x 0.8-11 cm, the axis and branches glabrous to puberulent or hispidulous, the peduncle obsolete or up to 3 cm long, the pedicels glabrous to sparsely hispidulous, obsolete or up to 4 mm long (of similar length in fruit). Flowers unisexual or sometimes bisexual, plants dioecious or sometimes monoclinous or andromonoecious; sepals glabrous or with a few trichomes at apex, connate at base or up to 3/4 their length, 0.3-0.8 mm long, the free portion ovate-triangular to rounded, persistent in fruit; petals white, greenish, or pale yellow, valvate or narrowly imbricate, glabrous, lanceolate to ovate, elliptic, or narrowly elliptic, 1.5-3.5 mm long, deciduous in fruit; stamens 8 or sometimes 4, the antesepalous ones in male and bisexual flowers (1.2-)1.5-4 mm long (0.5-3.5 mm long in female flowers), the filament sparsely pilosulose to villosulous in proximal 1/4-1/2 adaxially or glabrous, acute to subulate at apex, the anther 0.2-0.6 mm long (0.1-0.6 mm long in female flowers); disc glabrous to villosulous; gynoecium glabrous, in female and bisexual flowers 0.8-1.6 mm long (subobsolete or up to 0.5 mm long in male flowers), the carpels 2-ovulate, the style including stigma 0.5-1 mm long, the stigma capitate and 4-lobed or 4-branched, 0.3-1 mm wide. Fruiting carpels glabrous throughout, connate at base or up to 1/3 their length, ascending or divaricate, subglobose to broadly ellipsoid, 2.5-5 mm long, the exocarp subfleshy, the endocarp adnate, at least toward apex; seed attachment Type A; seeds subglobose to broadly ellipsoid, 2.5-4.5 mm long.

DISTRIBUTION. Taiwan and Ryukyu Islands southward to Borneo and thence eastward to New Guinea and New Britain; in Borneo, the species grows in primary and secondary forest, from sea level to 1300 m.

**OTHER SPECIMEN EXAMINED - BORNEO. SARAWAK**: 7th Division: Gunung Dulit, *Asah ak Luang* S.22764 (A, L, SING). 5th Division: Lawas, *Brooke* 10276 (L, SING, US); Ba Kelalan, *Brooke* 10356 (L). **SABAH**: Pendalaman: Kampung Kapalu, *Lantoh* SAN 73521 (L, SAN); Kemabong to Katubu, mile 4, *Cockburn & Saikeh* SAN 70055 (L). Sandakan: Lamag, Bukit Korong Karamuak, Kinabatangan, *Lejangah* SAN 44421 (L). Tawau: Lahad Datu, Dam Segama, *Muin bin Chai* SAN 31676 (L); Silam, *Ahmad Talip* SAN 52864 (L, SAN); Semporna, *D.D. Wood (leg. Evangelista)* 1237 (A, K, UC). **KALIMANTAN**: Timur: West Kutai, Longibut, *Endert* 2624 (BO, L), 2668 (BO, L); West Kutai, Longpetak, *Endert* 3324 (A, BO, L).

As seen in Borneo, *Melicope triphylla* has glabrous, mostly trifoliolate leaves 11.5-36 cm long. The petiolules are 2-15 mm long and the leaflet blades, which are 8-25 X 2.5-6 cm, are chartaceous, elliptic or narrowly so to oblanceolate, and are acuminate at apex. The plants are dioecious and the flowers are 8-staminate with ovate-triangular sepals which are connate in their proximal 1/4.

From its congeners in Borneo, *Melicope triphylla* differs mainly in its combination of 8-staminate flowers, comparatively small fruiting carpels, and Type A seed attachment.

**4. Melicope bonwickii** (F. Muell.) T. Hartley, **comb. nov.** *Euodia bonwickii* F. Muell., Fragm. 5 (1865) 56. Type: *Dallachy*, Australia, Queensland, North Kennedy, Seaview Range *apud sinum litoralem* Rockingham Bay, 1 June 1865 (holotype MEL).

*Euodia speciosa* Rchb. f. & Zoll. ex Teijsm. & Binnend. in Natuurk. Tijdschr. Ned.-Indie 29 (1867) 255. Type: *Zollinger,* Java, Timur, prope Banjoe-Wangie [Banjuwangi] (not seen?). *Zollinger* 3929 (W), from Blambangan [about 25 km S of Banjuwangi], may be a type. At any rate, Teijsmann & Binnedijk's protologue is adequate for the identification of this plant.

*Euodia villamilii* Merr. in Philipp. J. Sci. (Bot.) 9 (1914) 296. Type: *Villamil* FB 20653, Philippines, Luzon, Laguna, Mt. Maquiling (isotype US).

Tree 6-40 m high, trichomes simple. Young branchlets glabrous or glabrate or rarely sparsely pubescent, 5-9 mm wide in third internode; terminal bud appressed-pubescent. Leaves opposite, trifoliolate, 14-40 cm long; petiole glabrous, 2-14.5 cm long, 2-4 mm wide at middle; petiolules obsolete or up to 4 mm long; leaflet blades chartaceous or subcoriaceous, with scattered trichomes on venation below or glabrous, in lateral leaflets elliptic to obovate, in terminal leaflet obovate, 10-30 x 5-15 cm, the base acute to attenuate (often inequilateral in lateral leaflets), the margin entire, the apex acuminate, the midrib plane or impressed above, the main veins prominulous or plane above, in terminal leaflet 14-24 per side, divergent at angle of 50-70°, sometimes with domatium-like cavities in axils below, the veinlet reticulation prominulous to obscure. Inflorescences ramuligerous and rarely axillary, many-flowered, 3.5-10 x 5.5-13 cm, the axis and branches nearly glabrous or sparsely puberulent, the peduncle sometimes corky-exfoliating, 0.5-4 cm long, the pedicels pubescent or sparsely so, 3-8 mm long (3.5-10 mm long in fruit). Flowers bisexual; sepals nearly glabrous to puberulent abaxially, glabrous adaxially, connate at base, suborbicular, 1.5-2 mm long, persistent in fruit; petals pink or rarely white, narrowly imbricate, glabrous or sparsely puberulent abaxially, sericeous-villous adaxially, ovate to elliptic or elliptic-oblong, 3.5-5.5 mm long, deciduous in fruit; stamens 4, 5-10 mm long, the filament glabrous, subulate to filiform at apex, the anther 1.5-2 mm long; disc pubescent to sericeous-villous; gynoecium 5-10 mm long, the ovary sericeous-villous, the carpels 2-ovulate, the style glabrous, including stigma 4-9 mm long, the stigma punctiform or capitellate, 0.2-0.3 mm wide. Fruiting carpels connate at base, ascending or divaricate, subglobose to broadly obovoid, 4-6 mm long, the exocarp somewhat dry, sparsely pilose or glabrate, the endocarp glabrous, adnate, at least toward apex; seed attachment Type B, the funiculus 1-3 mm long, 0.2-0.5 mm wide at middle; seeds subglobose to ellipsoid or subhemispherical, 3-4.5 mm long.

DISTRIBUTION. Philippines southward to Java and thence east to New Guinea and northeastern Australia; in Borneo, the species grows in primary and secondary forest, from near sea level to 750 m.

**OTHER SPECIMENS EXAMINED - BORNEO. SABAH**: Pendalaman: Kaingaran, 10 miles E of Tambunan, *Alabazo* A 3623 (L), *Wood & Charington* SAN 17022 (A, L, SAN); Tenom, Pangi, mile 81, *Singh* SAN 27457 (BO, L). **KALIMANTAN**: Timur: Kaliurang, S of

Sangkulirang, *Kostermans* 4936 (L). Selatan: Martapura, *Dachlan* bb 2150 (BO); Pleihari, Tandjung, *Anon.* bb 10157 (L, U).

As seen in Borneo, *Melicope bonwickii* has pedicels that are 4-6 mm long at anthesis and 6-8.5 mm long in fruit. The petals are 4-5.5 mm long.

From its congeners in Borneo, *Melicope bonwickii* is distinguishable by its comparatively long pedicels, comparatively large flowers, and usually pink petals.

**5. Melicope denhamii** (Seem.) T. Hartley, **comb. nov.** *Picrasma denhamii* Seem., Fl. Vit. (1865) 33. Type: *McGillivray* 46, New Hebrides, Aneitum [Aneityum] (holotype BM).

*Euodia tenuistyla* Stapf in Trans. Linn. Soc. London, Bot. 4 (1894) 137. Type: *Haviland* 1376, Borneo, Sabah, Pantai Barat, Mt. Kinabalu, Kowng, (holotype K; isotype SING).

*Euodia ridleyi* Hochr. in Icon. Bogor. 2 (1905) tab. 151. *Euodia schullei* var. *ridleyi* (Hochr.) Lauterb. in Bot. Jahrb. Syst. 55 (1918) 230. *Euodia suaveolens* var. *ridleyi* (Hochr.) Bakh. f. in Blumea 6 (1950) 365. Probable type: *Backer*, Java, Bot. Gard. Bogor (ex Bot. Gard. Singapore), Dec. 1904 (isotype U).

Shrub or tree 0.5-25 m high, trichomes simple, fasciculate, or stellate. Young branchlets like the petioles glabrous to velutinous or tomentose, 1.5-9 mm wide in third internode; terminal bud nearly glabrous to velutinous or tomentose. Leaves opposite, trifoliolate (occasional leaves unifoliolate) 3-38 cm long; petiole 1-13(-16) cm long, (0.5-)0.7-4 mm wide at middle; petiolules obsolete or up to 7(-10) mm long; leaflet blades chartaceous to coriaceous, glabrous to pubescent below, glabrous to sparsely puberulent, or midrib pubescent, above, broadly ovate or broadly elliptic to lanceolate or linear or in terminal leaflet broadly obovate to oblanceolate, in terminal leaflet 2-27 x 0.2-15 cm, the base subcordate or broadly rounded to attenuate, the margin entire to repand, sinuate, or strongly lobed, sometimes undulate, the apex gradually tapering or acuminate to caudate, the midrib plane or impressed or rarely prominent above, the main veins prominent to impressed above, in terminal leaflet 10 to about 60 per side, divergent at angle of 55-90°, the veinlet reticulation prominulous to obscure below and above or impressed above. Inflorescences axillary and/or ramuligerous, several- to densely many-flowered, 2-17 x 0.8-16 cm, the axis and branches glabrous to velutinous or tomentose, the peduncle 0.5-5 cm long, the pedicels glabrous to pubescent, 0.2-1.5(-2.3) mm long (of similar length in fruit). Flowers bisexual or sometimes female, plants monoclinous or sometimes female; sepals nearly glabrous to villosulous abaxially, glabrous adaxially, connate at base or up to 1/3 their length, ovate to triangular, 0.2-0.8 mm long, persistent in fruit; petals white to green or yellowish, narrowly imbricate, glabrous, ovate-elliptic or elliptic, 1.2-2.2 mm long, usually persistent or subpersistent in fruit; stamens 4, 1.5-4 mm long, the filament glabrous, subulate to filiform at apex, the anther 0.6-1.2 mm long (similar in size but without pollen in female flowers); disc glabrous to villosulous; gynoecium 1.2-3.5 mm long, the ovary glabrous to villosulous, the carpels 2-ovulate, the style glabrous or rarely sparsely pilosulose, including stigma 0.7-3 mm long, the stigma punctiform or capitellate,

0.1-0.2 mm wide. Fruiting carpels connate at base, ascending or divaricate, subglobose, 2-3 mm long, the exocarp dry or subfleshy, glabrous to sparsely hispidulous or sparsely pilosulose, the endocarp glabrous, adnate, at least toward apex; seed attachment Type B, the funiculus 0.6-1.5 mm long, 0.2-0.6 mm wide at middle; seeds subglobose or somewhat hemispherical, 1.5-2.5 mm long.

DISTRIBUTION. Borneo east to the southern Philippines and Caroline Islands and southeast throughout eastern Malesia to the Solomon Islands, New Hebrides, and Fiji; in Borneo, the species grows in primary and secondary forest and swamp land, from near sea level to 950 m.

**OTHER SPECIMENS EXAMINED - BORNEO. SABAH**: Pendalaman: Keningau, Kauraan, *Angian* 7744 (L, SING). Pantai Barat: N of Kepong Takutan, *Shea & Aban* SAN 77190 (SAN); Mt. Kinabalu, Kiau 2, *Sinanggul* SAN 51367 (L, SAN); Mt. Kinabalu, Kampung Kiau 1, *Nooteboom & Aban* 1598 (B, BISH, CANB, L, SAN); Mt. Kinabalu, Kalawat, *J. & M.S. Clemens* 27232 (A, BO, L, NY, UC). Sandakan: Sandakan, *D.D. Wood (leg. Puasa)* 1174 (UC). **KALIMANTAN**: Timur: West Kutai, *Marah, Endert* 2350 (A, BO, L); Balikpapan, Mentawir and vicinity, *Kostermans* 4530 (L), *10009* (CANB), *Sauveur* H 15a (BO, L, SING), 114 (BO, L). Kalimantan without precise locality, *Heutz* 807 (U).

The name *Euodia ridleyi*, given in the synonymy above, refers to a putative cultigen which apparently originated in Papuasia and is now cultivated elsewhere in Malesia as well as in Europe and North America. The plant, which is represented by the D.D. Wood collection cited above, has lobed, sinuate, or repand leaflet blades which are ± linear in outline and have about 20-60 main veins on either side of the midrib.

Two other putative cultigens of *Melicope denhamii* which may be cultivated in Borneo can be characterized as follows: 1) leaflet blades strongly lobed (sometimes trilaminate with lowermost sinuses reaching the midrib), usually ovate in outline; 2) leaflet blades repand or sometimes entire, often undulate, lanceolate to narrowly elliptic or oblanceolate, the main veins 18-28 per side.

Wild-type plants of *Melicope denhamii*, as seen in Borneo, have leaflet blades that are sparsely puberulent to pubescent on the midrib and main veins below, elliptic or narrowly so, 10-19 cm long, the base narrowly obtuse or acute to subattenuate, the margin entire, the apex acuminate, and the main veins are 15-22 on each side of the midrib. The axis and branches of inflorescences are pubescent and the pedicels are glabrous or nearly so. The flowers are bisexual with a glabrous disc and pubescent ovary.

From its congeners in Borneo, *Melicope denhamii* differs mainly in its combination of very small, bisexual flowers, punctiform or capitellate stigma, glabrous petals which are usually persistent or subpersistent in fruit, and its tendency to have ramuligerous inflorescences and fasciculate or stellate trichomes.

**6. Melicope confusa** (Merr.) Liu, I11. Native Introd. Lign. Pl. Taiwan 2 (1962) 876. *Euodia confusa* Merr. in Philipp. J. Sci. 20 (1922) 391. Type: *Ramos* BS 15055, Philippines, Luzon, Laguna Province (not seen). Many of the numerous paratypes were seen.

Tree 2-28 m high, trichomes simple. Young branchlets like the petioles glabrous to sparsely pubescent, 4-15 mm wide in third internode; terminal bud puberulent to velutinous. Leaves opposite, trifoliolate, 16-54 cm long; petiole 2.5-18.5 cm long, 1.5-5 mm wide at middle; petiolule in lateral leaflets 3-12 mm long, in terminal leaflet 4-15 mm long; leaflet blades chartaceous to coriaceous, glabrous to pubescent below, glabrous above, elliptic to obovate, or broadly so, or in lateral leaflets sometimes ovate or broadly so, in terminal leaflet 12-35 x 5-18 cm, the base acute to subattenuate (rarely inequilateral in lateral leaflets), the margin entire, the apex acuminate, the midrib and main veins prominulous to impressed above, the main veins in terminal leaflet 11-24 per side, divergent at angle of (55-)60-70°, the veinlet reticulation prominent or prominulous, at least below, or rarely obscure. Inflorescences axillary, often stout, many-flowered, 6-30 x 4-24 cm, the peduncle glabrous to puberulent, 3-12 cm long, the main branches ascending, the distal axis and branches nearly glabrous to pubescent, the pedicels puberulent or sparsely so, 1-3 mm long (2-6 mm long in fruit). Flowers unisexual or sometimes occasional flowers bisexual, plants dioecious or sometimes andromonoecious; sepals puberulent or sparsely so abaxially, glabrous adaxially, connate at base, suborbicular or ovate, 0.6-1 mm long, persistent or rarely deciduous in fruit; petals white or greenish white, narrowly imbricate, glabrous or nearly so abaxially, sericeous or sericeous-pubescent or rarely sparsely pubescent, at least in proximal 1/2, adaxially, ovate-elliptic to broadly elliptic, 1.5-3 mm long, deciduous in fruit; stamens 4, in male and bisexual flowers 2.5-4 mm long (1-2.8 mm long in female flowers), the filament sparsely pilosulose in proximal 1/5 adaxially or glabrous, subulate to filiform at apex, the anther 1-1.5 mm long (0.8-1 mm long in female flowers); disc pubescent; gynoecium in female and bisexual flowers 2-2.5 mm long (0.2-1.5 mm long in male flowers), the ovary pubescent, the carpels 2-ovulate, the style sparsely pilose to pubescent, at least in proximal 1/3, including stigma 1.5-2 mm long, the stigma capitate, weakly 4-lobed, 0.5-0.8 mm wide. Fruiting carpels connate in proximal 1/5-1/3, ascending or divaricate, subglobose to ellipsoid or obovoid, 4.5-6 mm long, the exocarp subfleshy, sparsely puberulent or glabrate, the endocarp glabrous, adnate, at least toward apex; seed attachment Type B, the funiculus 1-1.5 mm long, about 0.6 mm wide at middle; seeds subglobose to ovoid or broadly ellipsoid, 3.5-4 mm long, the raphe contorted, especially in chalazal region.

DISTRIBUTION. Philippines, northeastern Borneo, Celebes, and Moluccas; in Borneo, the species grows mainly in primary and secondary forest, from sea level to 90 m.

**OTHER SPECIMENS EXAMINED - BORNEO. SABAH**: Sandakan: Segaliud, *Cuadra* A 1015 (BO, SING), A 1106 (A, BO, BRI, SING); Lamag road, *Imbungan & Patrick* SAN 74190 (L, SAN, SING); Gomantong Forest Reserve, *Ahwing* SAN 38186 (L); Kretam, *Kadir & Kambatan* A 3537 (A, BO, L, SING). Tawau: Silam, Virgin Forest Reserve, *Ahmad Talip* SAN 68399 (L, SAN), *Sinanggul* SAN 57418 (L, SING); Tanjong Batu Hill 3 miles N of Tawau, *G.H.S. Wood* SAN 17204 (A, BRI, L, SING).

As seen in Borneo, *Melicope confusa* is dioecious, the pedicels are about 5 mm long in fruit, and the petals are 2.5-3 mm long and are sericeous or sericeous-pubescent adaxially.

From its congeners in Borneo, *Melicope confusa* is distinguishable by its unisexual flowers with adaxially sericeous or sericeous-pubescent petals and by its seeds, which have a contorted raphe.

**7. Melicope glabra** (Blume) T. Hartley, **comb. nov.** *Fagara glabra* Blume, Catalogus (1823) 40. *Euodia glabra* (Blume) Blume, Bijdr. (1825) 245. *Ampacus glabra* (Blume) Kuntze, Revis. Gen. Pl. 1 (1891) 98. Type: *Blume*, Java (Lectotype US, here designated). Blume did not precisely designate a type. In the 1825 reference he gave two localities (*Provinciarum Buitenzorg et Tjanjor*) and the local name *kisampang*. The lectotype is labelled "*Kisampang*, *Fagara glabra* Bl." in Reinwardt's hand. The specimen matches Blume's descriptions in having obovate leaflet blades that are attenuate at base and obtuse at apex, uppermost-axillary inflorescences, and male flowers. Specimens at A and L with the same label as the lectotype have female flowers and otherwise do not match Blume's descriptions. They are *Melicope lunu-ankenda* (Gaertn.) T. Hartley.

*Euodia kingii* Engl. in Engl. & Prantl, Nat. Pflanzenfam. 3, 4 (1896) 121. Type: Malakka [Malaya *sensu* Engler], "*E. glabra* King in herb." The B material of this was presumably lost. It was probably the same plant that King (in J. Asiat. Soc. Bengal, pt. 2, Nat. Hist. 62 (1893) 208. correctly identified as *Euodia glabra* (Blume) Blume.

*Euodia krukoviii* Merr. in Pap. Michigan Acad. Sci. 24 (1938) 75. Type: *Krukoff* 4315, Sumatra, Utara, Asahan, Hoeta [Huta] Padang (holotype NY; isotypes A, BRI, L, SING, US).

Tree 12-40 m high, trichomes simple. Young branchlets like the petioles glabrous to velutinous, 4-10 mm wide in third internode; terminal bud sparsely puberulent to velutinous. Leaves opposite, trifoliolate (occasional leaves unifoliolate), (10-)12-25 cm long; petiole (2-)3-8.5 cm long, 1.5-3.5 mm wide at middle; petiolules 1-20 mm long; leaflet blades subcoriaceous, nearly glabrous to pubescent on midrib and main veins below or glabrous, in lateral leaflets elliptic to obovate, or broadly so, in terminal leaflet obovate or broadly so, (7.5-)9-16.5 x 4-12 cm, the base acute to attenuate (somewhat inequilateral in lateral leaflets), the margin entire, the apex abruptly and usually obtusely short-acuminate or sometimes rounded, obtuse, or emarginate, the midrib impressed above, the main veins plane or impressed above, in terminal leaflet 9-15 per side, divergent at angle of 50-60°, the veinlet reticulation obscure or sometimes plane below, obscure above. Inflorescences axillary, usually stout, many-flowered, 7-30 x 4-20 cm, the axis and branches glabrous to velutinous, the peduncle 3.5-14 cm long, the main branches ascending, the pedicels sparsely puberulent to velutinous, 0.6-2 mm long (0.6-4 mm long in fruit). Flowers unisexual, plants dioecious; sepals glabrous to puberulent abaxially, glabrous adaxially, connate at base or rarely up to 1/4 their length, suborbicular to ovate, 0.6-0.8 mm long, persistent in fruit; petals white, narrowly imbricate, sparsely pubescent

in proximal 1/5-1/2 adaxially or glabrous, ovate-elliptic or elliptic, 2-2.5 mm long, deciduous in fruit; stamens 4, in male flowers 2.5-4.5 mm long (1-2 mm long in female flowers), the filament glabrous, subulate to filiform at apex, the anther 1-1.2 mm long (about 0.6 mm long in female flowers); disc glabrous to pubescent; gynoecium in female flowers 1.5-2.5 mm long (0.6-0.8 mm long in male flowers), the ovary nearly glabrous to pubescent, the carpels 2-ovulate, the style glabrous to pilosulose, including stigma 1-2 mm long, the stigma capitate or capitate-peltate, weakly 4-lobed, 0.3-0.5 mm wide. Fruiting carpels connate in proximal 1/6-1/3, ascending, subglobose or broadly ellipsoid, 3-4 mm long, the exocarp subfleshy, glabrous to sparsely pubescent, the endocarp glabrous, adnate, at least toward apex; seed attachment Type B, the funiculus about 1 mm long, about 0.6 mm wide at middle; seeds subglobose to broadly ovoid or broadly ellipsoid, 2.5-3 mm long.

DISTRIBUTION. West Malaysia, Singapore, Sumatra, and western Java; mostly in primary forest; below 500 m throughout the range and ascending to 900 m in Sumatra and to 1200 m in Java.

I have not seen material of *Melicope glabra* from Borneo, but a report of it from Sabah (Keith, 1952: 373, as *Evodia glabra*) may be valid. From the known Bornean species of the genus, it differs mainly in the following combination of features: trichomes simple, terminal leaflet blades obovate or broadly so (7.5-)9-16.5 x 4-12 cm, the apex abruptly and usually obtusely acuminate or sometimes rounded, obtuse, or emarginate, the midrib impressed above, the main veins plane or impressed above, 9-15 per side, divergent at angle of 50-60°; inflorescences 7-30 cm long, the main branches ascending; fruiting carpels 3-4 mm long.

**8. Melicope lunu-ankenda** (Gaertn.) T. Hartley, **comb. nov.** *Fagara lunu-ankenda* Gaertn. Fruct. Sem. Pl. 1 (1788) 334, *tab. 68, fig. 9. Fagara zeylanica* J.F. Gmelin, Syst. Nat. 2 (1791) 258 (not seen); Syst. Veg. 1 (1796) 258. *nom. illeg. Zanthoxylum zeylanicum* (J.F. Gmelin) DC, Prodr. 1 (1824) 728, *nom. illeg. Euodia lunu-ankenda* (Gaertn.) Merr. in Philipp. J. Sci. (Bot.) 7 (1912) 378, as *lunur-ankenda*. Type: *Konig*, Ceylon (holotype L).

*Euodia aromatica* Blume, Bijdr. (1825) 246, as Evodia, *non Evodia* (*sensu* Gaertn.) *aromatica* (Sonn.) Pers., 1806. *Zanthoxylon aromaticum* (Blume) Miq., Fl. Ned. Ind. 1 (2) (1859) 670. *Ampacus aromatica* (Blume) Kuntze, Revis. Gen. Pl. 1 (1891) 98. Type: *Blume* 137, Java, Timur, Gunung Parang (holotype L).

[*Fagara triphylla sensu* Roxb. Fl. Ind. 1 (1820) 436, excl. syn., *non* Lam., 1798.] *Zanthoxylum roxburghianum* Cham. in Linnaea 5 (1830) 58. *Euodia roxburghiana* (Cham.) Benth., Fl. Hongk. (1861) 59. *Ampacus roxburghiana* (Cham.) Kuntze, Revis. Gen. Pl. 1 (1891) 98. *Euodia malayana* Ridl., Fl. Malay Penins. 1 (1922) 342, *nom. illeg.* Type: cult. Bot. Gard. Calcutta; introduced by Roxburgh from Penang (not seen). Roxburgh's description, apparently drawn up from living material at Calcutta, is reasonably adequate for the identification of this plant. I doubt if a type was preserved. Roxburgh incorrectly

gave Linnaeus as the author of *Fagara triphylla*. In the reference he cited (Sp. Pl. ed. Willd. 1 (1798) 666), Willdenow correctly referred the species to Lamarck.

*Euodia arborea* Elmer, Leafl. Philipp. Bot. 8 (1915) 2806. Type: *Elmer* 13159, Philippines, Palawan, Puerto Princesa, Mt. Pulgar (isotypes A, BISH, GH, L, NSW, NY, U, US, W).

*Euodia punctata* Merr. in J. Straits Branch Roy. Asiat. Soc. 86 (1922) 315. Type: *Ramos* 1289, Borneo, Sabah, Sandakan, Batu Lima, near Sandakan (holotype PNH, not seen, presumably lost, photo at A; isotypes A, L, P, US).

*Euodia triphylla* var. *pubescens* Ridl. in Kew Bull. (1930) 77. Syntypes: *Creagh*, Borneo, Sabah, east coast (holosyntype K); *Motley* 681, "Sarawak, Banjermassin" (holosyntype K). The Motley syntype was probably collected in Kalimantan at Bandjarmasin.

*Euodia concinna* Ridl. in Kew Bull. (1930) 78. Type: *Haviland* 2039, Borneo, Sarawak, 4th Division, Mt. Buan (holotype K).

*Euodia obtusifolia* Ridl. in Kew Bull. (1930) 78, *non* DC. 1824. Type: *Hose* 513 (as 512 in protologue), Borneo, Sarawak, 4th Division, Baram, Miri River (holotype K; isotype L).

Shrub or tree 1.5-27 m high; trichomes mostly simple. Young branchlets like the petioles glabrous to short-velutinous, 2.5-8 mm wide in third internode; terminal bud sparsely puberulent to velutinous. Leaves opposite, trifoliolate (occasional leaves unifoliolate), 6-37 cm long; petiole 1.5-15 cm long, 1-2.8 mm wide at middle; petiolule in lateral leaflets 0.5-10 mm long, in terminal leaflet 1-15 mm long; leaflet blades chartaceous or subcoriaceous or rarely coriaceous, puberulent or sparsely so on midrib, especially below, and sometimes on main veins below, or glabrous, elliptic to obovate or sometimes ovate-elliptic, in terminal leaflet 3.5-23 x 2.5-7 cm, the base in lateral leaflets obtuse to attenuate, often inequilateral, in terminal leaflet acute to attenuate, the margin entire, the apex acuminate or caudate or rarely rounded or emarginate to acute, the midrib prominulous to slightly impressed above, the main veins prominulous or plane above, in terminal leaflet 8-17 per side, divergent at angle of 60-70°, the veinlet reticulation prominulous to obscure. Inflorescences axillary, sometimes stout, usually many-flowered, 2-32 x 1-16 cm, the axis and branches glabrous to short-velutinous, the peduncle 0.8-15 cm long, the main branches usually ascending, the pedicels nearly glabrous to short-velutinous, 0.3-3 mm long (2.5-5 mm long in fruit). Flowers unisexual or rarely bisexual, plants dioecious or rarely andromonoecious or monoclinous; sepals glabrous to puberulent abaxially, glabrous adaxially, connate at base or up to 1/4 their length, suborbicular to ovate or ovate-triangular, 0.5-1.2 mm long, persistent in fruit; petals white or pale green to yellow or cream, narrowly imbricate, glabrous to sparsely puberulent abaxially, pilosulose in proximal 1/4-1/2 or glabrous adaxially, ovate to elliptic, 1.5-3 mm long, deciduous or subpersistent in fruit; stamens 4, in male and bisexual flowers 2-4 mm long (0.5-3 mm long in female flowers), the filament pilosulose in proximal 1/5-1/3 adaxially or glabrous, subulate to filiform at apex, the anther 1-1.5 mm long (0.3-1 mm long in female flowers); disc nearly glabrous to pubescent or short-velutinous; gynoecium in female and bisexual flowers 1-3 mm long (0.2-1 mm long in male flowers), the ovary nearly glabrous to densely pubescent,

the carpels 2-ovulate, the style glabrous to pilosulose, including stigma 0.5-2.5 mm long, the stigma capitate, weakly 4-lobed, 0.3-0.8 mm wide. Fruiting carpels connate at base, ascending or divaricate, ellipsoid to obovoid, 4-10(-12) mm long, the exocarp subfleshy, glabrous to sparsely puberulent, the endocarp glabrous, adnate, at least toward apex; seed attachment Type B, the funiculus 0.5-3 mm long, 0.2-1.4 mm wide at middle; seeds subglobose to ovoid or ellipsoid, sometimes somewhat compressed, 3-6 mm long.

DISTRIBUTION. Himalaya southward to Ceylon, Java, Celebes, and southwestern Philippines; in Borneo, the species grows in primary and secondary well-drained or swampy forest and montane shrubbery, from sea level to 2200 m.

**OTHER SPECIMENS EXAMINED - BORNEO. SARAWAK**: 1st Division: Kuching, *E. Bartlett, 1893* (SING); Bidi Cave, *J. & M.S. Clemens* 20623 (A, B, BISH, BO, L, UC); Bau, Bukit Kolong, *Chai & Seng* S.16190 (L); Pedawan road, Gunung Mantawa, *J.A.R. Anderson* 12529 (L, SING). 5th Division: Gunung Murud, *Burtt & Martin* 5458 (E), *Nooteboom & Chai* 2050 (L). Sarawak without precise locality, *Haviland & Hose* 559C (CAL), 559E (L), *native collector* 135 (A), 795 (A, BO, L). **BRUNEI**: Belait, Lumut Hills, *van Niel* 4444 (L). **SABAH**: Pendalaman: Lumat, *P. Binideh* SAN 58427 (L, SAN), *Saikeh Lantoh* SAN 73399 (L, SAN, SING); Klias, *Apostal* 41 (UC, W); Keningau, Sook Plain Forest Reserve, *Dewol Sundaling* SAN 80751 (SAN), SAN 80789 (SAN), *Saikeh Lantoh* SAN 73280 (L, SAN); N of Pangi, mile 81, *Jaswir* SAN 27466 (BO), *Singh* SAN 27442 (BO, L, SING); Pangi, *Charington* SAN 22203 (SING); Tenom vicinity, *P. Binideh* SAN 55834 (A); Sapong, *Buntar* SAN 27265 (L, SING), *Mikil* SAN 31888 (L, SING); Bish trail above Sapong, *Sadau* SAN 42592 (L, SAN); Tomani, Murut trail, *Sadau* SAN 49465 (L, SAN), SAN 49487 (L); Jalan Ulu Tomani, *Rundi* SAN 43196 (L); Crocker Range South, *Rundi* SAN 43022 (L, SAN). Pantai Barat: Kudat vicinity, *Brand* SAN 30957 (L); Tinangul, Napui Hill, *Ampuria* SAN 41543 (L); Bak Bak, *Brand* SAN 30920 (L); Laya Laya River, *Balajadia* BNBFD 3266 (BO); Langkon, *Cuadra* A 3172 (CANB, L, NY, SING, US); Mt. Kinabalu and vicinity, *Carr* SF 26910 (SING), SF 27225 (SING), *Chew & Corner* RSNB 4681 (L, SING), RSNB 7054 (CANB), *J. & M.S. Clemens* 31106 (A, B, BO, L, NY, SING, UC), *Kinabalu Natl. Park labourer* SAN 61974 (L), *Sario* SAN 28550 (BO, L, SAN, SING). Sandakan: Sungai Paitan Forest Reserve, *Ajik bin Gohol* SAN 23955 (L, SING); Sandakan and vicinity, *Castro* NBFD 4560 (A, BO, L, SING), *Cuadra* A 2184 (A, BO, L), *Evangelista* 723 (A, NY), *Puasa* BNBFD 1733 (A), NBFD 9038 (A, BO, BRI, L, SING, US); Betotan, *Apostal* BNBFD 3455 (A); Sepilok Forest Reserve, *Cockburn* SAN 64985 (L), *Kadir* A 2517 (A, BO, SING), *Meijer & Singh* SAN 24788 (L, SING), *Nicholson* SAN 17281 (A, BO, BRI, L, SING); *Sam & Kapis bin Sisiron* SAN 19220 (BO, L, SING), *Wood & Charington* SAN 16302 (BO, BRI, L), *Zain* SAN 64708 (L, SING); Lamag, Kinabatangan, Tidog Camp, *Ampuria* SAN 33297 (L, SING); Batu Puteh, *Maidin* BNBFD 1738 (A, BO); without precise locality, *D.D. Wood* (leg. Salinos) 2010 (BO, UC) 2026 (UC, W), *D.D. Wood (leg. Puasa)* 2117 (BO, UC, W). Tawau: Oxbow Lake E of Segama Tobacco Estate, *G.H.S. Wood* SAN 16154 (A, BRI, L, SING); Apas road, mile 14, *Aban Gibot* SAN 27220 (L); Tawau, *Elmer* 21061 (A, BISH, GH, L, NY, P, PH, SING, U, UC), 21143 (A, BISH, BO, L, PH, SING, U, UC). **KALIMANTAN**: Barat: Sungai Pinju bij Anjongan, *Polak* 699 (BO, L); Pontianak, Sungai Air Hitam, Wadjo, *Enoh* 349 (BO, L). Tengah: Sampit and vicinity, *Anon* bb 2661 (L), *Buwalda* 7716 (BO, L), *Kostermans* 4712 (A, L, SING). Timur: Pladju,

*Amdjah* 65 (BO, L, U), 79 (BO, L); Mt. Palimasan, Tabang on Belajan River, *Kostermans* 12947 (CANB, L), 13022 (L); Blajan River near Samarinda, *Nedi* 748 (A, L, LAE, SING); Djembajan, *Pangkeij* bb 25146 (BO, L); Gunung Beratus, *Kostermans* 7498 (A, BO, L, SING), *7687* (A, BO, L, SING). Selatan: Marabahan, Sei Badandan, *Dachlan* 21 (BO); km 14 tusschen Bandjermasin en Martapura, *Polak* 415 (BO), 491 (A, L); Tanahbumbu, *Verhoef* bb 13350 (BO); Laut Island, Sei Paring, *Hildebrand* 1 (L). Kalimantan without precise locality, *Rameli* 2370 (L), *Rasjid* ZOB 2441 (L), *Sauveur* 1155 (L).

As seen in Borneo, *Melicope lunu-ankenda* has leaflet blades that are glabrous or nearly so with the main veins prominulous above. The fruiting carpels are 6-10(-12) mm long with glabrous or nearly glabrous exocarp.

*Melicope lunu-ankenda* is most nearly related to *M. glabra* and *M. clemensiae*. From the former, it differs mainly in its larger fruiting carpels and the main veins of its leaflet blades, which are prominulous or plane above and diverge from the midrib at an angle of 60-70°. From the latter, it differ mainly in its larger petals and anthers and more densely-flowered inflorescences.

Some of the Bornean plants of *Melicope lunu-ankenda* from montane habitats, for example, *Nooteboom & Chai* 2050, from Gunung Murud, and *J. & M.S. Clemens* 31106, from Mt. Kinabalu, have fruiting carpels that are 9-12 mm long and leaflet blades that are coriaceous with rounded to abruptly and obtusely acuminate apex. In these features, they contrast rather markedly with lowland plants of the species, which usually have smaller fruiting carpels and have thinner-textured leaflet blades which are usually acuminate to caudate at apex. The two variants intergrade, however, and I prefer to treat them as a single taxon.

**9. Melicope clemensiae** T. Hartley, **sp. nov.**

*Frutex vel arbor 1.5-12 m alta, trichomatibus pro parte maxima simplicibus; ramulis novellis ut petiolis glabris usque minute velutinis; gemma terminali fere glabra usque minute velutina; foliis oppositis, trifoliolatis (raro foliis infrequentibus unifoliolatis), 6.5-25 cm longis; petiolo 1.5-8 cm longo; petiolulo in foliolis lateralibus 1.5-10 mm longo, in foliolo terminali 1.5-12 mm longo; foliolorum laminis glabris vel in costa (apprime subtus) sparse et minute puberulis, in foliolo terminali ellipticis vel anguste ellipticis usque obovatis vel oblanceolatis, 5-16 x 2-5.5 cm; inflorescentiis axillaribus, laxe pluri- vel multifloris, 2.5-16 x 2-11 cm, axe et ramis glabris usque minute velutinis, ut pedicellis tenuibus, ramis principalibus plerumque patentibus, pedicellis fere glabris usque minute velutinis, 2-5 mm longis (in fructu 3-6 mm longis); floribus unisexualibus (plantae dioeciae); sepalis glabris vel abaxialiter puberulis, basi vel usque 1/3 longitudine connatis, 0.5-0.8 mm longis; petalis glabris, 1.5-1.6 mm longis, in fructu deciduis; staminibus 4, in floribus masculis 1.5-2 mm longis (in floribus femineis 1-1.5 mm longis), filamento glabro, apice subulato, anthera 0.5 mm longa (in floribus femineis 0.3-0.4 mm longa); gynoecio in floribus femineis 1-1.5 mm longo (in floribus masculis ca. 0.2 mm longo), ovario fere glabro usque sparse pubescenti, stylo glabro, stigmate capitato, inconspicue 4-lobato, ca. 0.5 mm lato; carpellis*

*fructificatibus basi connatis, ascendentibus vel divaricatis, subglobosis usque late ellipsoideis vel obovoideis, 7-9 mm longis, exocarpio subcarnoso, glabrato, endocarpio glabro, saltem apicem versus adnato; seminibus per Type B affixis, subglobosis usque ovoideis vel late ellipsoideis, aliquantum compressis, 5-7 mm longis.*

*Typus: Aban Gibot SAN 60767, Borneo, Sabah, Pantai Barat, Kinabalu Natl. Park, mile 35, Ranau (holotypus L; isotypus SAN ).*

Shrub or tree 1.5-12 m high, trichomes mostly simple. Young branchlets like the petioles glabrous to minutely velutinous, 1.6-3 mm wide in third internode; terminal bud nearly glabrous to minutely velutinous. Leaves opposite, trifoliolate (rarely occasional leaves unifoliolate), 6.5-25 cm long; petiole 1.5-8 cm long, 1-1.5 mm wide at middle; petiolule in lateral leaflets 1.5-10 mm long, in terminal leaflet 1.5-12 mm long; leaflet blades subcoriaceous, glabrous or the midrib (especially below) sparsely and minutely puberulent, in lateral leaflets elliptic or elliptic-obovate, or narrowly so, in terminal leaflet elliptic or narrowly so to obovate or oblanceolate, 5-16 x 2-5.5 cm, the base acute to subattenuate (in lateral leaflets often inequilateral), the margin entire, the apex acuminate, the midrib plane or slightly impressed or rarely prominulous above, the main veins prominulous above, in terminal leaflet 11-18 per side, divergent at angle of 60-70°, the veinlet reticulation obscure above or prominulous. Inflorescences axillary, laxly several- or many-flowered, 2.5-16 x 2-11 cm, the axis and branches glabrous to minutely velutinous, like the pedicels thin, the peduncle 1.5-7 cm long, the main branches usually spreading, the pedicels nearly glabrous to minutely velutinous, 2-5 mm long (3-6 mm long in fruit). Flowers unisexual, plants dioecious; sepals puberulent abaxially or glabrous, connate at base or up to 1/3 their length, suborbicular to ovate or ovate-triangular, 0.5-0.8 mm long, persistent in fruit; petals white, greenish white, or cream, narrowly imbricate, glabrous, ovate to elliptic, 1.5-1.6 mm long, deciduous in fruit; stamens 4, in male flowers 1.5-2 mm long (1-1.5 mm long in female flowers), the filament glabrous, subulate at apex, the anther 0.5 mm long (0.3-0.4 mm long in female flowers); disc nearly glabrous or pubescent; gynoecium in female flowers 1-1.5 mm long (about 0.2 mm long in male flowers), the ovary nearly glabrous to sparsely pubescent, the carpels 2-ovulate, the style glabrous, including stigma 0.6-1 mm long, the stigma capitate, weakly 4-lobed, about 0.5 mm wide. Fruiting carpels connate at base, ascending or divaricate, subglobose to broadly elliptic or obovoid, 7-9 mm long, the exocarp subfleshy, glabrate, the endocarp glabrous, adnate, at least toward apex; seed attachment Type B, the funiculus 1.5-2 mm long, 0.3-0.8 mm wide at middle; seeds subglobose to ovoid or broadly ellipsoid, somewhat compressed, 5-7 mm long.

DISTRIBUTION. Endemic to northern Borneo: primary forest from 800 to 1800 m.

**OTHER SPECIMENS EXAMINED - BORNEO. SARAWAK**: 7th Division: Hose Mts., Bukit Temedu, *Banying ak Nyudong* S.19031 (L, SING). 4th Division: Gunung Leeuakok, upper Baram, *Moulton* SF 6845 (SING); Bukit Mersing, Anap, *Sibat ak Luang* S.22129 (L, SING). 5th Division: Mt. Murud East, Belapan River - Dapo River, *Nooteboom & Chai* 1836 (B, BISH, CANB, L); Pa Lungan, *Nooteboom & Chai* 2095 (B, BISH, CANB, K, L). **SABAH**: Pantai Barat (all from Mt. Kinabalu and vicinity): Tenompok, *Carr* SF 26914 (SING), *J. &*

*M.S. Clemens* 28590 (A, B, L, NY, SING, UC), 28590A (A, BO, L, NY); Penibukan, *J. & M.S. Clemens* 50317 (NY); Sosopodon, Kundasang, *Taipin* SAN 47960 (L); Liwogo Sosopodon, *Sinanggul* SAN 47971 (L, SAN); Sosopodon Forest Reserve, *Aban Gibot* SAN 64027 (SAN).

*Melicope clemensiae* is very closely related to *M. subunifoliolata*, differing mainly in its glabrous or nearly glabrous leaflet blades and its smaller, glabrate fruiting carpels. The two differ from other Bornean species of the genus mainly in their combination of somewhat laxly flowered inflorescences, very small, unisexual flowers, and comparatively large fruiting carpels.

The specific epithet commemorates Mary Strong Clemens.

**10. Melicope subunifoliolata** (Stapf) T. Hartley, **comb. nov.** *Euodia subunifoliolata* Stapf in Trans. Linn. Soc. London, Bot. 4 (1894) 138. Type: *Haviland* 1193, Borneo, Sabah, Pantai Barat, Mt. Kinabalu (holotype K).

Shrub (rarely scrambling) or tree 1.8-12 m high, trichomes mostly simple. Young branchlets like the petioles pubescent to velutinous, 2-3 mm wide in third internode; terminal bud velutinous. Leaves opposite, trifoliolate and/or unifoliolate. Trifoliolate leaves 6-24.5 cm long; petiole 1-9 cm long, 1-2 mm wide at middle; petiolule in lateral leaflets 0.6-8 mm long, in terminal leaflet 1-10 mm long; leaflet blades subcoriaceous, pubescent to velutinous on midrib and sometimes sparsely pubescent on main veins below, glabrous above, in lateral leaflets elliptic or elliptic-obovate, in terminal leaflet elliptic to obovate, 5-15.5 x (1.5-)2.3-5.5 cm, the base acute to subattenuate or in terminal leaflet attenuate, the margin entire, the apex acuminate, the midrib plane or slightly impressed or rarely prominulous above, the main veins prominulous or plane above, in terminal leaflet 10-20 per side, divergent at angle of 60-80°, the veinlet reticulation prominulous or rarely obscure below, prominulous or obscure above. Unifoliolate leaves 5-9.5 cm long; petiole 0.8-1 cm long, 0.7-1 mm wide at middle; petiolule obsolete or up to 1 mm long; leaflet blade elliptic or elliptic-obovate, 4.3-8.5 x 1.5-3.5 cm, the base acute, the main veins 11-14 per side, divergent at angle of about 70°; otherwise similar to trifoliolate leaves. Inflorescences axillary, several- or rather laxly many-flowered, 3-13 x 1-5 cm, the axis and branches pubescent to velutinous, the peduncle 1.5-8 cm long, the main branches ascending, the pedicels sparsely puberulent to short-velutinous, 1-2.5 mm long (2.5-4.5 mm long in fruit). Flowers unisexual, plants dioecious; sepals sparsely puberulent to pubescent abaxially, glabrous adaxially, connate at base, ovate or ovate-triangular, 0.7-1.5 mm long, persistent in fruit; petals white or cream, narrowly imbricate, glabrous, ovate-elliptic or elliptic, 1.3-1.8 mm long, deciduous or rarely subpersistent in fruit; stamens 4, in male flowers 1.5-2.5 mm long (1-2 mm long in female flowers), the filament glabrous, subulate to filiform at apex, the anther about 0.5 mm long (0.2-0.3 mm long in female flowers); disc pubescent on top; gynoecium in female flowers 1-2 mm long (0.5-0.7 mm long in male flowers), the ovary pubescent, the carpels 2-ovulate, the style pilosulose, at least in proximal 1/4, including stigma 0.6-1.5 mm long, the stigma capitate, weakly 4-lobed, 0.5-0.6 mm wide. Fruiting carpels connate at base, divaricate, ellipsoid, 10-10.5 mm long, the exocarp somewhat

dry, hirsutulous, the endocarp glabrous, adnate, at least toward apex; seed attachment Type B, the funiculus 0.5-1.5 mm long, 0.6-0.7 mm wide at middle; seeds subglobose to ovoid, often somewhat compressed, 5-6.3 mm long.

DISTRIBUTION. Endemic to Sabah; primary forest; (180-)1350-2400 m.

**OTHER SPECIMENS EXAMINED - BORNEO. SABAH**: Pendalaman: Gunung Alab, *Nooteboom* 1029 (B, BISH, CANB, L, SAN). Pantai Barat (all from Mt. Kinabalu and vicinity): Mamut Hill, *Kokawa & Hotta* 5366 (L); Natl. Park Headquarters, *Kanis & Sinanggul* SAN 51487 (SAN); Mesilau River, *Chew & Corner* RSNB 4195 (CANB), RSNB 4354 (SING); Ulu Liwagu and Ulu Mesilau, *Chew et al.* RSNB 2735 (CANB, SING); Mesilau Cave trail, *Meijer* SAN 48079 (SAN); Ulu Langanani, *Chew et al.* RSNB 1271 (CANB); Bembangan River, *Chew & Corner* RSNB 4971 (SING); Lumu trail, *J. & M.S. Clemens* 27845 (NY); 1 mile S of Lumu, *Wood & Wyatt-Smith* SAN A 4487 (A, BRI, L, SING); Tenompok, *Carr* SF 27874 (SING), *J. & M.S. Clemens* 29776 (A, B, BO, NY, SING, UC), 29829 (BO, L); Penibukan, *J. & M.S. Clemens* 40893 (A, NY, L); below Kamborongoh, *Nicholson* SAN 36810 (L); Gurulau Spur, *J. & M.S. Clemens* 50724 (A, L, NY, UC), 51464 (A, NY); without precise locality, *Aban Gibot* SAN 57794 (L, SAN), SAN 60756 (L, SAN), SAN 74122 (L, SAN, SING). *Ampon et al.* SAN 71835 (L, SAN, SING), *Griswold* 94 (A), *Mikil* SAN 36187 (L).

*Melicope subunifoliolata* is very closely related to *M. clemensiae* (*q.v.*).

**11. Melicope accedens** (Blume) T. Hartley, **comb. nov.** *Euodia accedens* Blume, Bijdr. (1825) 246. *Zanthoxylon accedens* (Blume) Miq., Fl. Ned. Ind. 1(2)(1859) 671. *Ampacus accedens* (Blume) Kuntze, Revis. Gen. Pl. 1 (1891) 98. Type: *Blume*, Java (Lectotype L, here designated); Blume did not precisely designate a type.

*Euodia macrophylla* Blume, Bijdr. (1825) 246. *Zanthoxylon macrophyllum* (Blume) Miq., Fl. Ned. Ind. 1(2)(1859) 670. *Ampacus macrophylla* (Blume) Kuntze, Revis. Gen. Pl. 1 (1891) 98. Type: *Blume,* Java (Lectotype L, here designated). Blume's type locality ("*in montanis circa Tjiradjas Provinciae Krawang*") does not appear on any of the sheets examined. The first author to unite *Euodia accedens* and *E. macrophylla* was Miquel (in Ann. Mus. Bot. Lugduno-Batavum 3 (1867) 242), who did so under the name *E. accedens*. The point is relevant only in *Euodia*, however, because the specific epithet *macrophylla* is pre-empted in *Melicope.*

*Euodia nervosa* Koord. & Val. in Meded. Lands Plantentuin 17 (1896) 208. Type: *Koorders* 6953B, Java, Barat, Preanger, Djampangwetan, Takoka (holotype BO).

Shrub (rarely scandent?) or tree 1-40 m high, trichomes mostly simple. Young branchlets like the petioles glabrous to pubescent or velutinous or rarely tomentose, 3-15 mm wide in third internode; terminal bud puberulent to velutinous or rarely tomentose. Leaves opposite, trifoliolate (occasional leaves unifoliolate), 12-74 cm long; petiole 2.5-33 cm long,

1.5-7 mm wide at middle; petiolule in lateral leaflets obsolete or up to 15(-20) mm long, in terminal leaflet obsolete or up to 35 mm long; leaflet blades chartaceous or subcoriaceous, nearly glabrous to pubescent, or midrib velutinous, below, glabrous to sparsely pubescent, or midrib velutinous, above, elliptic to obovate, or sometimes narrowly so, in terminal leaflet 9.5-46 x 4-21 cm, the base in lateral leaflets rounded to subattenuate, often inequilateral, in terminal leaflet obtuse to attenuate, the margin entire, the apex acuminate or rarely obtuse, acute, or caudate, the midrib prominulous to impressed or rarely prominent above, the main veins plane or impressed or rarely prominulous above, in terminal leaflet 10-24(-26) per side, divergent at angle of (50-)60-75(-80)°, the veinlet reticulation prominulous or plane or rarely obscure. Inflorescences axillary, several- to densely many-flowered, 3-19(-24) x 2-13(-18) cm, the axis and branches glabrous to pubescent or velutinous or rarely tomentose, the peduncle 0.5-7(-10) cm long, the main branches usually spreading, the pedicels nearly glabrous to pubescent or velutinous, 0.5-3.5 mm long (0.6-5 mm long in fruit). Flowers unisexual or sometimes bisexual, plants dioecious or sometimes andromonoecious or monoclinous; sepals nearly glabrous to pubescent or hirsutulous or rarely glabrous abaxially, glabrous adaxially, connate at base or up to 1/3 their length, ovate to narrowly triangular or rarely suborbicular, 0.5-1.5(-2) mm long, persistent in fruit; petals white to green or pale yellow, narrowly imbricate, glabrous to appressed-pubescent or hirsutulous abaxially, sparsely puberulent to pubescent or sparsely pilosulose in proximal 1/4-1/2 or sometimes glabrous adaxially, ovate or broadly so to elliptic-obovate, 1.5-2.8 mm long, deciduous or rarely somewhat persistent in fruit; stamens 4, in male and bisexual flowers (2-)2.5-4 mm long (0.5-2.5 mm long in female flowers), the filament pilosulose, or sparsely so, in proximal 1/6-1/2 adaxially or glabrous, subulate to filiform at apex, the anther 0.7-1.2 mm long (0.4-0.8 mm long in female flowers); disc glabrous to densely pubescent or rarely velutinous; gynoecium in female and bisexual flowers 1.5-3.5 mm long (0.5-1 mm long in male flowers), the ovary glabrous to pubescent or villous or rarely velutinous, the carpels 2-ovulate, the style pilosulose to pubescent or villosulous, at least in proximal 1/4, including stigma 1-3 mm long, the stigma capitate or capitate-peltate, weakly 4-lobed, 0.3-0.5 mm wide. Fruiting carpels connate at base, divergent, subglobose to ellipsoid or obovoid, 3-6(-7) mm long, the exocarp subfleshy, glabrous to pubescent or rarely velutinous, the endocarp glabrous, adnate, at least toward apex; seed attachment Type B, the funiculus 0.3-1.5 mm long, 0.3-1(-1.5) mm wide at middle; seeds subglobose to ovoid or ellipsoid, sometimes compressed and often asymmetrical at chalazal end, 2.5-4.5(-5) mm long.

DISTRIBUTION. Andaman Islands east to Vietnam and south to Java; in Borneo, the species grows in well-drained, primary and secondary forest, swamp forest, heath forest, peat swamp, borders, and open places, from sea level to 1950 m.

**OTHER SPECIMENS EXAMINED - BORNEO. SARAWAK**: 1st Division: Matang, *Burley & Lee* 325 (CANB); Kuching , *Brooke* 8689 (L, US), 9430 (L, US), *Haviland & Hose* 3401C (CAL), 3401E (L), 3401F (UC); Bau, *Purseglove* 4453 (L); Setapok Forest Reserve, *J.A.R. Anderson* 9082 (L, SING); Stapok, *Brunig* S.17530 (L); Semengoh Forest Reserve, *Hou* 576 (A, L). 3rd Division: Balingian, Bukit Iju, *Jugah ak. Kudi* S.27300 (L). 7th Division: Mt. Majau, *J. & M.S. Clemens* 21817 (A, NY). 4th Division: Tatau, Bukit Buan, *Ashton* S.16499 (A, BO, L, SING). 5th Division: Kalabit Highlands, Batu Lawi, *Nooteboom & Chai*

2284 (L). Sarawak without precise locality, *native collector* 134 (A, BO, L, US), 468 (A, US), 2152 (A). **SABAH**: Pendalaman: Tulid vicinity, *Dewol Sundaling* SAN 80831 (SAN), *Talib et al.* SAN 80394 (SAN). Pantai Barat: Kota Belud, *Wyatt-Smith* KEP 80395 (A, L); Kota Kinabalu - Sunsuran road, mile 28, *Cockburn* SAN 65460 (SING); Mt. Kinabalu and vicinity, *Badak* SAN 32344 (L), *Chew et al.* RSNB 37 (CANB), RSNB 2855 (BO, CANB, SING), *M.S. Clemens* 9868 (A, UC), 10848 (A, UC), *J. & M.S. Clemens* 26759 (A, BO, L, NY, UC), 28161 (A, L, NY, UC), 28161A (A, B, BO, L, NY, UC), 30659 (A, BO, L, NY, UC), 33767 (A, B, BO, L, NY, UC), 50533 (A, L, NY, UC), *Aban Gibot* SAN 57788 (L, SAN), *Hou* 246 (L), *Kadir* A 1647 (A, BO, L), *Kaul & Bogle* 2013 (GH), *Mikil* SAN 56285 (L, SAN), *Sinanggul* SAN 38304 (L), *Sinclair et al.* 9233 (E, L), *Singh* SAN 27484 (L). Sandakan: Mamahat, *Jawanting & Ampuria* SAN 32629 (L, SAN); Bongaya Forest Reserve, *Kodoh & Aban* SAN 82031 (SAN); Gum Gum, *Puasa & Enggoh* NBFD 10679 (A, L, SING); Sandakan and vicinity, *Anthony* A 776 (A, BO, BRI, US), *Elmer* 20100 (A, BISH, BO, CANB, GH, L, NSW, NY, PH, U, UC), *Evangelista* 660 (NY); Kabili-Sepilok Forest Reserve, *Enggoh* BNBFD 7267 (A, BO, BRI, L, US), NBFD 10184 (A, L, SING), *Keith* NBFD 7226 (A, BRI, CANB, L, US), *Meijer* SAN 24858 (SAN), *Onggib* NBFD 10586 (L, SING). Tawau: Lucia Forestry District, Apas road, mile 10, *Kadir* A 2101 (A, BO, CANB); Tawau, *Elmer* 21893 (A, BISH, CANB, GH, L, NY, P, PH, U, UC). Sabah without precise locality, *D.D. Wood* 955 (US), 2664 (A, UC), *Villamil*, Jan.-Mar. 1916 (US). **KALIMANTAN**: Barat: Oelu Kenepai, *Hallier* 1448 (BO); Sungai Kenepai, *Hallier* 1976 (BO, L, U); Liang Gagang, *Hallier* 3031 (BO, L); Bukit Raya, *Nooteboom* 4845 (CANB), *Hans Winkler* 874 (L). Timur: Nunukan Island, N part, *Kostermans* 8705 (BO, L, SING), 9048 (BO, L); Mt. Kemul, *Endert* 4492 (BO, L); West Kutai, Benuwatuwa, *Endert* 1612 (A, BO, L).

As seen in Borneo, *Melicope accedens* has petioles up to 24 cm long, petiolules up to 15 mm long, elliptic to obovate leaflet blades with the main veins usually impressed above, basally obtuse to subattenuate lateral leaflet blades, and fruiting carpels 3-5 mm long.

Among its congeners in Borneo with 4-staminate, usually unisexual flowers, *Melicope accedens* differs mainly in its combination of mostly simple trichomes, comparatively large leaflet blades with main veins usually impressed above, comparatively large inflorescences with main branches usually spreading, and comparatively small, basally connate fruiting carpels.

Two variants of *Melicope accedens* occur in Borneo. Their main characteristics, which intergrade completely, at least in extra-Bornean plants, are summarized below.

Variant A: sepals nearly glabrous or sparsely puberulent abaxially; petals glabrous or nearly so abaxially; fruiting carpels 3-4 mm long, the exocarp glabrous or sparsely puberulent; leaflet blades nearly glabrous to pubescent below, with 13-24 main veins on each side of midrib; throughout the range of the species excepting the Andaman Islands.

Variant B: sepals pubescent or hirsutulous abaxially; petals glabrous to pubescent abaxially; fruiting carpels 4-5 mm long, the exocarp pubescent; leaflet blades sparsely puberulent to pubescent below, with 10-16 main veins on each side of the midrib; Andaman Islands, Malay Peninsula, Sumatra (Atjeh), and Borneo (Sarawak and Sabah).

**12. Melicope hookeri** T. Hartley, **nom. nov.** *Euodia robusta* Hook. f., Fl. Brit. India 1 (1875) 488. *Ampacus robusta* (Hook. f.) Kuntze, Revis. Gen. Pl. 1 (1891) 98. Syntypes: *Phillips*, Malaya, Penang (not seen); *Herb. Maingay Kew Distrib. No. 278* p.p., Singapore (Lectotype GH, here designated). A Leiden sheet with this Maingay number is *Melicope glabra* (Blume) T. Hartley. The specific epithet *robusta* is pre-empted in *Melicope*.

Tree 9-25 m high, trichomes mostly fasciculate or stellate. Young branchlets like the petioles glabrous to short-velutinous, 3-7.5 mm wide in third internode; terminal bud puberulent to short-velutinous. Leaves opposite, trifoliolate (occasional leaves unifoliolate), 12-33 cm long; petiole 4-13 cm long, 1.3-3 mm wide at middle; petiolule in lateral leaflets 1-8 mm long, in terminal leaflet 2-15 mm long; leaflet blades subcoriaceous, nearly glabrous to puberulent below, glabrous above or sometimes midrib and main veins puberulent or minutely so, in lateral leaflets ovate to elliptic or elliptic-obovate, in terminal leaflet ovate-elliptic to obovate or rarely ovate, 7.5-18 x 4-9.5 cm, the base in lateral leaflets obtuse to acute or rarely rounded or subattenuate, in terminal leaflet acute to subattenuate or rarely obtuse, the margin entire, the apex acuminate or abruptly so, the midrib impressed or sometimes plane above, the main veins plane or impressed above, in terminal leaflet 15-22 per side, divergent at angle of (50-)55-70°, the veinlet reticulation prominulous to plane below and above or impressed above. Inflorescences axillary, many-flowered, 10-26 x 6.5-17 cm, the peduncle glabrous to pubescent, 4.5-13 cm long, the main branches ascending, the distal axis and branches sparsely puberulent to pubescent, the pedicels puberulent or sparsely so, 0.3-1.5 mm long (1-2.5 mm long in fruit). Flowers unisexual or rarely bisexual, plants dioecious or rarely monoclinous; sepals nearly glabrous to puberulent abaxially, glabrous adaxially, connate at base, suborbicular to ovate-triangular, 0.5-0.6 mm long, persistent in fruit; petals white or greenish white, narrowly imbricate, glabrous, ovate to elliptic, 1.5-2 mm long, deciduous in fruit; stamens 4, in male and bisexual flowers 2.5-3.5 mm long (1.5-2 mm long in female flowers), the filament sparsely pilosulose in proximal 1/4 adaxially or glabrous, subulate to filiform at apex, the anther 0.8-1 mm long (0.6-0.7 mm long in female flowers); disc villous or villosulous, at least on top; gynoecium in female and bisexual flowers 1-1.5 mm long (0.5-1 mm long in male flowers), the ovary villous or villosulous, or sparsely so, the carpels 2-ovulate, the style pilosulose in proximal 1/3-3/4, including stigma 0.8-1 mm long, the stigma capitate, weakly 4-lobed, 0.3-0.4 mm wide. Fruiting carpels connate at base, ascending or divaricate, subglobose to obovoid, 3.5-4 mm long, the exocarp subfleshy, glabrous or sparsely puberulent, the endocarp glabrous, adnate, at least toward apex; seed attachment Type B, the funiculus 1-1.2 mm long, 0.2-0.5 mm wide at middle; seeds subglobose to ellipsoid, 2.5-3.5 mm long.

DISTRIBUTION. West Malaysia, Singapore, Sumatra, and Borneo; primary and secondary forest and borders; at lower altitudes throughout the range and ascending to 1600 m in Borneo.

**OTHER SPECIMENS EXAMINED - BORNEO. BRUNEI**: Kuala Abang road, *Ashton* BRUN 5094 (BO, BRI, L, SING). **SABAH**: Pendalaman: Gunung Alab, *Nooteboom* 1021 (L, SAN); Beaufort Hill, *Madius* SAN 50052 (L, SAN); Kepong Tulid, *Leopold & Aloysius* SAN 74404 (L, SAN), *Leopold & Saikeh* SAN 74459 (L, SAN); Ulu Sipitang 5 miles E of

Sipitang, *G.H.S. Wood* SAN 16919 (A, BRI, L, SING). Pantai Barat: Kota Belud, Kelawat Forest Reserve, *Ampuria* SAN 40377 (L, SAN); Mt. Kinabalu, Bungal, *J. & M.S. Clemens* 30014 (A, BO, L, NY); Penampang, Sunsuran trail, *Mikil* SAN 37764 (L, SAN, SING). **SARAWAK**: 1st Division, Kampong Sadir, *Mamit* S.33409 (L). **KALIMANTAN**: Barat: Sanggau, *Hallier* 790a (BO, L), *Anon.*, bb 17218 (A, L), bb 18642 (A, L); Lebang Hara, *Hans Winkler* 386 (L). Tengah: Sungai Kahayan 5 km NW of Haruwn, *Burley et al.* 368 (CANB); Puruktjau, Ma Tupuh, *Atmoesoewarno* bb 10605 (BO). Timur: near Mt. Kemui, *Endert* 4301 (BO, L); Longbangun, Camp Tikah, *Wiriadinata* 648 (CANB); Djembajan, *Samioedin* bb 24675 (A, BO, L, NY, SING); peak of Balikpapan (Gunung Beratus), *Kostermans* 7627 (A, BO, BRI, L, SING); Balikpapan, Sepaku, *Anon.* bb 13929 (L). Borneo without precise locality, *Beccari* 2762 (P).

*Melicope hookeri* is very closely related to *M. incana* (*q.v.*). The specific epithet commemorates Joseph Dalton Hooker.

**13. Melicope incana** T. Hartley, **nom. nov.** *Euodia alba* Hook. f. in Trans. Linn. Soc. London 23 (1862) 166. *Ampacus alba* (Hook. f.) Kuntze, Revis. Gen. Pl. 1 (1891) 98. Type: *Lobb*, Borneo, *in ora septentrionalis*, 1857 (holotype K). The specific epithet *alba* is pre-empted in *Melicope*.

Tree 4-18(-33) m high, trichomes mostly stellate. Young branchlets like the petioles and inflorescences puberulent to short-velutinous, 4-8.5 mm wide in third internode; terminal bud velutinous. Leaves opposite, trifoliolate, 12-45 cm long; petiole 3-20 cm long, 2-4 mm wide at middle; petiolule in lateral leaflets obsolete or up to 2 mm long, in terminal leaflet obsolete or up to 3 mm long; leaflet blades subcoriaceous, densely whitish-tomentose below, nearly glabrous to sparsely and minutely puberulent, or midrib densely puberulent, above, in lateral leaflets ovate to elliptic, or broadly so, in terminal leaflet elliptic to obovate, or broadly so, 9-25 x 5-16 cm, the base in lateral leaflets rounded or obtuse, in terminal leaflet obtuse to cuneate, the margin entire, the apex somewhat abruptly acuminate, the midrib and main veins impressed above, the main veins in terminal leaflet 20-25 per side, divergent at angle of 60-70°, the veinlet reticulation prominulous below or obscure. Inflorescences axillary, many-flowered, 9-23 x 4-17 cm, the peduncle 4.5-12 cm long, the main branches ascending, the pedicels 0.3-1 mm long (1-1.5 mm long in fruit). Flowers unisexual or rarely bisexual, plants dioecious or rarely monoclinous; sepals puberulent to densely pubescent abaxially, glabrous adaxially, connate in proximal 1/4-1/3, suborbicular to ovate-triangular, 0.5-0.7 mm long, persistent in fruit; petals white, narrowly imbricate, sparsely puberulent in longitudinal median line abaxially or glabrous, ovate-elliptic or elliptic, 1.7-2 mm long, deciduous in fruit; stamens 4, in male and bisexual flowers 2.5-3.5 mm long (1.5-2 mm long in female flowers), the filament glabrous, subulate to filiform at apex, the anther about 1 mm long (0.7-1 mm long in female flowers); disc sericeous-pubescent; gynoecium in female and bisexual flowers 1.5-2 mm long (0.6-1 mm long in male flowers), the ovary sericeous-pubescent, the carpels 2-ovulate, the style puberulent in proximal 2/3-3/4, including stigma 1-1.5 mm long, the stigma capitate, weakly 4-lobed, about 0.3 mm wide. Fruiting carpels connate at base, ascending, ellipsoid to obovoid, 3-4 mm long, the exocarp somewhat dry, nearly glabrous or sparsely

puberulent, the endocarp glabrous, adnate, at least toward apex; seed attachment Type B, the funiculus about 1 mm long, about 0.3 mm wide at middle; seeds subglobose, about 2 mm long.

DISTRIBUTION. East-central Sumatra, Borneo, and northern Celebes; well-drained, primary and secondary forest, alluvial forest, and freshwater swamp forest; sea level to 800 m.

**OTHER SPECIMENS EXAMINED - BORNEO. SARAWAK**: 1st Division: Stabut, Padawan, *Mamit* S.29816 (L). 7th Division: Kapit, *J. & M.S. Clemens* 21054 (NY); Ulu Kapit, Sungai Paku near Rumah Rapek, *Chai et al.* S.33228 (L). **SABAH**: Pendalaman: Ingaran, between Tambunan and Mt. Trusmadi, *Nooteboom 1335* (B, BISH, CANB, SAN), *1353* (B, L, SAN), *Cuadra* A 1339 (BO, CANB, SING); Weston, Bukit Suhai Mengalong, *Suleiman* BNBFD 2177 (A, BO). Pantai Barat: Mt. Kinabalu, Kibayo to Keung, *M.S. Clemens* 9884 (A, UC); Mt. Kinabalu, Dallas, *J. & M.S. Clemens* 26017 (A, L, NY), 26805 (A, L, NY); Kilimu, *N. Binideh* SAN 65107 (L); Kimanis, *Bayak* BNBFD 2122 (A). Sandakan: Telupid, mile 81, *Leopold & Amin* SAN 75352 (A, L, SAN, SING). Tawau: Lahad Datu, Kretam, *G.H.S. Wood* A 3485 (L, SING). **KALIMANTAN**: Natuna Islands: Bunguran, Gunung Ranai, *van Steenis* 1353 (L). Barat: Mempawah, Andjongan, *Schuitemaker* bb 15588 (BO, L). Timur: West Kutai, Kiham Batu Beng, *Endert* 2250 (A,L); Balikpapan Bay, Muan, near Sungai Riho, *Kostermans* 4104 (A, BO, L). Selatan: Sungai Tabelong, Kayup, *Hub. Winkler* 2203 (BO, L), 2259 (L). Borneo without precise locality, *de Vriese*, 1859-60 (L, U).

Among the western Malesian species of the genus, *Melicope incana* is immediately recognizable by its densely whitish-tomentose leaflet blades. It is very closely related to *M. hookeri*, which differs mainly in its glabrous to puberulent leaflet blades. From their congeners in Borneo, the two species differ mainly in their combination of mostly fasciculate or stellate trichomes, pubescent disc, usually unisexual flowers, and petals that are deciduous in fruit.

The specific epithet refers to the whitish-tomentose leaflet blades.

**14. Melicope latifolia** (DC) T. Hartley, **comb. nov.** [*Ampacus latifolius* Rumph., Herb. Amboin. 2 (1741) 186, *tab.* 61.] *Euodia latifolia* DC, Prodr. 1 (1824) 724. *Zanthoxylum rumphianum* Cham. in Linnaea 5 (1830) 58, *nom. illeg. Zanthoxylum latifolium* (DC) G. Don, Gen. Hist. 1 (1831) 804. Type: *Doleschall* 335, Moluccas, Ambon (Neotype W, here designated). De Candolle based this species on Rumphius' protologue, but no type is designated in that account and the illustration is not sufficiently diagnostic to serve as the type.

Shrub or tree 2-27 m high, trichomes simple. Young branchlets like the petioles and inflorescences glabrous to softly hirsute, 2.5-10 mm wide in third internode; terminal bud sparsely puberulent to softly hirsute or rarely glabrous. Leaves opposite, trifoliolate (rarely

occasional leaves unifoliolate), 13-63 cm long; petiole 4-29 cm long, (1-)2-4 mm wide at middle; petiolule in lateral leaflets obsolete or up to 8 mm long, in terminal leaflet obsolete or up to 10 mm long; leaflet blades chartaceous, glabrous to softly hirsute below, glabrous to hirsutulous, or midrib softly hirsute, above, in lateral leaflets ovate to elliptic, in terminal leaflet elliptic to obovate or rarely ovate-elliptic, 8-37 x 3-19 cm, the base in lateral leaflets cordate or rounded to cuneate or rarely subattenuate, equi- or inequilateral, in terminal leaflet narrowly cordate or obtuse to cuneate or rarely subattenuate, the margin entire, the apex acuminate to caudate, the midrib plane or impressed above, the main veins prominulous to slightly impressed above, in terminal leaflet 14-31 per side, divergent at angle of 60-70°, the veinlet reticulation prominulous to obscure below and above or sometimes slightly impressed above. Inflorescences axillary, many-flowered (often densely so), 5-24 x 2-16 cm, the peduncle 0.5-7.5 cm long, the main branches spreading, the pedicels obsolete or up to 2(-3) mm long (0.5-3.5 mm long in fruit). Flowers unisexual or sometimes bisexual, plants dioecious or sometimes monoclinous; sepals glabrous to softly hirsute abaxially, glabrous adaxially, connate at base or up to 2/3 their length, 0.6-1.5 mm long, the free portion ovate to triangular or rounded, persistent in fruit; petals green to yellow or white, narrowly imbricate, glabrous to puberulent abaxially, glabrous adaxially, ovate to elliptic-obovate, 2-3(-4) mm long, deciduous in fruit; stamens 4, 2-4(-5) mm long, the filament glabrous, obtuse or narrowly so or sometimes acute at apex, the anther in male and bisexual flowers 0.6-1 mm long (0.3-0.5 mm long in female flowers); disc glabrous or nearly so; gynoecium in female and bisexual flowers 2.5-4 mm long (obsolete or up to 0.4 mm long in male flowers), the ovary glabrous to hispidulous or pubescent, the carpels 2-ovulate, the style pilosulose at base or up to 1/2 its length or glabrous, including stigma 2-3.5 mm long, the stigma capitate to peltate, 4-lobed or -undulate, 0.5-1 mm wide. Fruiting carpels connate in proximal 1/4 or up to their full length, divaricate after dehiscence, the capsule before dehiscence transversely elliptic in outline, 3-5 mm high, weakly lobed, impressed at apex, the exocarp somewhat dry, glabrous to sparsely pubescent, the endocarp glabrous, adnate, at least toward apex or dorsally; seed attachment Type B, the funiculus 0.5-1.5 mm long, 0.2-0.5 mm wide at middle; seeds subglobose to broadly ellipsoid or hemispherical, 2-3 mm long.

DISTRIBUTION. Java northeast to the Philippines and eastward to New Guinea, New Britain, Solomon Islands, and New Hebrides; also in Samoa; in Borneo, the species grows in primary and secondary forest and open places, from near sea level to 600 m.

**OTHER SPECIMENS EXAMINED - BORNEO. SABAH**: Pendalaman: Tambunan, *Nooteboom* 1281 (B, L, SAN); Bundu, *Goklin* BNBFD 3217 (A, BO, L); Keningau, *Angian* 7752 (SING). Pantai Barat: Kota Belud, Kelawat Forest Reserve, *Ampuria* SAN 41359 (L, SING); Kudat, Tagaru Forest Reserve, *Mait Battah* SAN 37657 (L); Banggi Island, *Ampuria* SAN 42106 (L), *Castro & Melegrito* 1721 (UC). Tawau: Silam, *Karim* SAN 68241 (SAN), *Muin bin Chai* SAN 29665 (L). Sabah without precise locality, *Agama* 1077 (A, L, US), *Goklin* 845 (A, NY).

As seen in Borneo, *Melicope latifolia* has indumentum on its branchlets, leaves, and inflorescences, the petiolules are obsolete, the lateral leaflet blades are cordate to rounded or obtuse, and usually inequilateral, at base, the terminal leaflet blades are narrowly

cordate or obtuse to cuneate at base, the sepals, which are connate in their proximal 1/3-2/3, are pubescent to softly hirsute abaxially, the style is glabrous or nearly so, and the fruiting carpels are connate in their proximal 1/4-1/2, ellipsoid, 3.5-4.5 mm long.

From its congeners in Borneo, *Melicope latifolia* is distinguishable by the comparatively high degree of connation of its sepals and fruiting carpels and its epetiolulate, basally cordate to rounded or obtuse, usually inequilateral lateral leaflets. Also, among the 4-staminate species, it is distinguishable by its usually obtuse staminal filaments.

**Excluded names**

*Melicope beccarii* (Hook. f.) Engl. in Engl. & Prantl, Nat. Pflanzenfam. 3, 4 (1896) 122 = *Tetractomia tetrandrum* (Roxb.) Merr. *fide* Hartley in J. Arnold Arbor. 60 (1979) 133.

*Melicope unifoliolata* Merr. in Philipp. J. Sci. (Bot.) 13 (1918) 74 = *Maclurodendron porteri* (Hook. f.) T. Hartley in Gard. Bull. Sing. 35 (1982) 8.

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